

Zitteliana	10	703–713	München, 1. Juli 1983	ISSN 0373 – 9627
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On the systematic position of the Early Cretaceous Mathoceratinae CASEY (Ammonoidea)

By

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With 2 plates

ABSTRACT

On the basis of an analysis of the literature, the morphologic patterns and the character of the suture line the author concludes that the Early Cretaceous subfamily Mathoceratinae CASEY must be transferred from the Deshayesitidae into the Leymeriellidae and must be reduced to generic rank. The new species, which RENZ (1978) attributed to the genus *Mathoceras* CASEY, served as the basis for the two new genera

Venezuella KVANTALIANI and *Renziella* KVANTALIANI which form the subfamily Venezuellinae KVANTALIANI in the family Leymeriellidae. Taking this and the geological situation in Tunisia and in Venezuela into account, the author suggests an Albian (Early Albian, and not Middle Aptian) age for the deposits, which contain the generic types of the named genera.

KURZFASSUNG

Aus Untersuchungen der Gehäusemorphologie, der Suturlinie und durch Literaturstudium wird geschlossen, daß die unterkretazische Unterfamilie Mathoceratinae CASEY aus der Familie Deshayesitidae in die Familie Leymeriellidae zu überführen ist und dabei in den Gattungsrang zurückversetzt wird.

Die neuen Arten, die RENZ (1978) zur Gattung *Mathoceras* CASEY stellte, dienen zur Aufstellung der neuen Gattungen

Venezuella KVANTALIANI und *Renziella* KVANTALIANI; zusammen bilden sie die Unterfamilie Venezuellinae KVANTALIANI innerhalb der Familie Leymeriellidae. Hierauf aufbauend und unter Berücksichtigung der geologischen Situation in Tunesien und Venezuela kommt der Autor zu der Annahme eines Alb-Alters (Unter-Alb und nicht Mittel-Apt) für die Ablagerungen aus denen die Genotypen der neubenannten Gattungen stammen.

INTRODUCTION

The main subject of this study is the subfamily Mathoceratinae CASEY, which is referred to the family Deshayesitidae STOYANOW. But for further conclusions the generic types of the family Leymeriellidae BREISTROFFER must be discussed.

In the Aptian and Early Albian seas the stenochronic ammonites – the generic types of the families Deshayesitidae, Douvilleiceratidae, Acanthohoplitidae and Leymeriellidae – had a worldwide distribution; they have been used therefore for a worldwide correlation.

Analyzing the abundant literature I came to the conclusion that the taxonomy of the family Deshayesitidae STOYANOW has

been basically changed after the publication of CASEY (1964), who established the subfamily Mathoceratinae and the genus *Mathoceras* – the main subject of this report. The type species of the genus was *Hoplites* (*Kilianella*?) *matho* (PERVINQUIÈRE, 1907: 185, pl. 7, figs. 31 a, b) from Lower Albian deposits of Tunisia. The new genus *Mathoceras* CASEY served as the basis for the new subfamily Mathoceratinae CASEY. Thus, CASEY divided the family Deshayesitidae into two subfamilies: Deshayesitinae STOYANOW and Mathoceratinae CASEY.

Mainly due to the lack of well preserved material many investigators did not examine the taxonomy of the subfamily Mathoceratinae (SCHINDEWOLF 1966: 683; WIEDMANN 1966: 25; KEMPER 1967; BOGDANOVA 1977, 1979; MIKHAILOVA 1976; BOGDANOVA, KVANTALIANI, SCHARIKADZE 1979 and others). Others raised this subfamily to the rank of an independent

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family Mathoceratidae (KULLMANN & WIEDMANN 1970: 18), though this change was based on the same material. The conception of CASEY (1964) was accepted also by RENZ (1978: 680) in his description of some new species of the genus *Mathoceras* CASEY from the Aptian (*martinioides* Zone) of Eastern Venezuela.

Consequently there coexist two different opinions about the taxonomy of the Deshayesitidae at present: an undivided subfamily in the USSR (MIKHAILOVA 1957 e. g.) and a splitted family with two subfamilies in all other countries.

The initial data: Before a careful analysis of the existing material, it is necessary to mention the initial material which served as the basis for CASEY: PERVINQUIÈRE's monograph (1907) in which he described the new species *Hoplites* (*Kilianella*?) *matho* from the Lower Albian (he referred the Clan-

sayesian to the Lower Albian) of Tunis, and BREISTROFFER (1947: 19) who conventionally referred PERVINQUIÈRE's species to the genus *Dufrenoyia*. Besides, reports by ROD & MAYNC (1954), RENZ (1978) and two little known monographs by SOLIGNAC (1927) and CASTANY (1951) should be mentioned.

For a detailed examination of the taxonomy of the Deshayesitidae I consider it necessary to study this problem in two aspects. First paleontologically, which implies a morphologic analysis of the generic types of the subfamily in comparison with those of other families; and second, biostratigraphically – for a review of the geologic situation in which the generic types of so-called Mathoceratinae and the accompanying fauna have been found in Tunisia and in Venezuela.

THE PALEONTOLOGICAL DATA

A similar pattern of development of the suture line and a peculiarity of morphology (pl. 1, figs. 1–7) are characteristic signs of the genera of the family Deshayesitidae: *Deshayesites* KASANSKY, *Dufrenoyia* BURCKHARDT, *Burckhardtites* HUMPHREY, *Prodeshayesites* CASEY (= *Neodeshayesites* CASEY), *Kuntziella* COLLIGNON, *Turkmeniceras* TOVBINA, *Paradeshayesites* KEMPER.

As mentioned by MIKHAILOVA (1957: 177) for adult individuals of the genera *Deshayesites* and *Dufrenoyia*, the inner top of the external saddle (pl. 1, figs. 1d, 2d, 3c, 4–7) is slightly higher than the external, and the external lobe (V) is unusually shortened in comparison to the lateral (L) one. This peculiarity can be observed within all other deshayesitids.

Of no less importance is the peculiarity that in typical Deshayesitidae the tubercular stage is absent during all the ontogeny. The ribs are simple, bending laterally and curving forward on the external side, and in most cases they are uninterrupted.

CASEY included in the subfamily Mathoceratinae such heterogeneous genera as *Cloioceras* WHITEHOUSE, *Somalites* TAVANI and *Mathoceras* CASEY. However, they can not be included in the usual limits of the Deshayesitidae.

WHITEHOUSE (1927) stated that the genus *Cloioceras* was an unusual branch of the Hemihoplitinae SPATH with two rows of tubercles, and already MIKHAILOVA (1957: 177) noted that it can not be referred to the Deshayesitidae. The genus *Somalites* can not be included in the Deshayesitidae because of its morphology and the character of the suture line. This genus has distinct tubercles (external, ventrolateral and umbilical) and also a strongly developed keel (pl. 1, figs. 8a, b). These two genera *Cloioceras* and *Somalites* must be excluded from the Deshayesitidae. Because of the lack of data I can not indicate to which family they must be referred.

For the third member of the subfamily, the genus *Mathoceras*, already CASEY (1964: 289) pointed out the resemblance of the sculpture and the suture line (see, pl. 2, figs. 6a–c) with the Albian genus *Leymeriella* and thus he came close to a correct attribution of the taxonomic position of the genus *Mathoceras*.

It is not difficult to guess that CASEY, like BREISTROFFER, were psychologically influenced by PERVINQUIÈRE's comparison of his species *Hoplites matho* with the typical deshayesitids *Dufrenoyia furcata* (SOW.) and *Dufrenoyia lurenensis* (KIL.). BREISTROFFER consequently referred the species to *Dufrenoyia*. Following this investigator, CASEY consequently referred *Mathoceras* to the Deshayesitidae.

PERVINQUIÈRE, however, made the comparison on the basis that *H. matho* and *Dufrenoyia furcata* (SOW.) belong to the genus *Hoplites* NEUMAYR, within which JACOB distinguished his new subgenus *Leymeriella*. Both papers were published simultaneously in 1907. If JACOB had known PERVINQUIÈRE's new species *H. matho* he probably would have included it in his new subgenus *Leymeriella*, as he had done with the species *Ammonites tardefurcatus* LEYMERIE and *Ammonites regularis* BRUGIÈRE.

An analysis of *Hoplites* (*Kilianella*?) *matho* PERVINQUIÈRE on the basis of the large specimen (PERVINQUIÈRE 1907, pl. 7, figs. 31a, b) enables to following description: The sculpture (pl. 2, figs. 6a, b) is represented by ribs discontinuous on the external side, where a sharp angle is formed between both ends. On the lateral sides and between the lateral and external tubercles on the depressed parts of the ribs medial grooves were observed; the ribs on the lateral sides bend slightly in an S-shaped manner; lateral and external tubercles and a weak umbilical thickening are developed; the umbilicus is moderately wide, not deep. The suture line (pl. 2, fig. 6c) does not differ from that of the generic types of the Leymeriellidae. I propose therefore to refer the genus *Mathoceras* CASEY to the subfamily Leymeriellinae s. str. of the family Leymeriellidae BREISTROFFER, 1951.

The new species described by RENZ (1978) – *Mathoceras venezolanum*, *M. sucre*, *M. caribense* and *M. laeve* (pl. 2, fig. 7–11) – show on the external side, as in Leymeriellidae common that the ribs are discontinuous; the external tubercles are counterplaced and form an angle. Beside some similar sculptural peculiarities a similar morphology of the suture line (pl. 2, figs. 7c, 8c) also relates these species to this family. The suture lines, both of *M. matho* (PERV.) and of the new species

of RENZ referred to the genus *Mathoceras*, have no resemblances with any other generic types of the various families spread in Aptian and Albian times.

Morphologic similarities in the suture lines of *M. matho* (PERV.) and the new species of RENZ with the Leymeriellidae are not accidental nor convergent but they are an expression of a genetic interconnection. Their taxonomic positions within the family of the Leymeriellidae is defined below.

Until now (perhaps with some insignificant differences) the following genera have been included in the Leymeriellidae: *Proleymeriella* BREISTROFFER, *Epileymeriella* BREISTROFFER, *Leymeriella* JACOB (with the subgenus *Leymeriella* JACOB and *Neoleymeriella* SAVELIEV) and *Pseudoleymeriella* CASEY. Now I include the genus *Mathoceras* (KVANTALIANI, 1980, 1981).

Mathoceras CASEY manifests the greatest resemblance to the subgenus *Leymeriella* (*Neoleymeriella*) SAVELIEV (1973). Both are characterized by the presence of lateral tubercles by which they are clearly distinguished from all other leymeriellids. *Mathoceras* differs from them in the existence of more distinct medial grooves on the ribs.

The new species of RENZ however are somewhat different not only from *Mathoceras* but from all other genera of the Leymeriellidae too. The Venezuelan species of RENZ are characterized mainly by the sharply expressed bitubercular (except of *M. laeve*) sculpture, in the presence of umbilicus thickenings on the main, relatively thin, widely placed ribs, by the presence of the solitary capillary intermediate ribs and, what is most important, by the absence of the medial groove on the main ribs. These differences, which were evidently acquired by the geographic isolation from the typical Leymeriellidae realm, are so perceptible that some new species with the same typical sculpture can be united in a new genus, for which I suggested (KVANTALIANI, 1980, 1981) the name *Venezuella*, according to the country Venezuela, where these ammonites were found first. The species, described under the name *Mathoceras laeve* is clearly distinguished from the other new species by its very thin-ribbed sculpture and by the absence of lateral tubercles (the character of the suture line is not known) and hence I consider it as a new genus, which I named *Renziella* – in honour of RENZ (KVANTALIANI, 1980, 1981).

Taking into account the considerable differences of the genera *Venezuella* KVANTALIANI (1980) and *Renziella* KVANTALIANI (1980) from the real Leymeriellinae, which are expressed by the absence of the medial groove on the lowered parts of the ribs (one of the main signs of the subfamily Leymeriellinae) and the presence of the widely placed main ribs with thin intermediate inserted ribs in the Leymeriellidae, I regard them as a new subfamily rank under the name *Venezuellinae* KVANTALIANI (1980). Thus, in the family Leymeriellidae there has appeared a special branch – a subfamily *Venezuellinae*, which in the process of evolution was most probably isolated from the primary group Leymeriellinae.

If the European realm is considered as the centre of the ge-

neration of the Leymeriellidae, some unknown ancestors of the *Venezuellinae* must have migrated from East to West.

During the migration to the Western part of the Mediterranean realm into the Caribbean paleozoogeographical province the typically Eastern Mediterranean forms probably greatly diverged. Subjected to geographical isolation and changeability they adapted to the new environments in the process of migration. Some changes in the morphology of the shell took place in spite of the individual signs inherited from the ancestors. In consequence of the natural selection the acquired new signs were fixed by inheritance and became characteristic of the new "South American" taxons.

Summarizing I suggest the taxonomy and the volume of the Deshayesitidae and Leymeriellidae in the following way:

Superfamily DESHAYESITOIDEA

Family Deshayesitidae STOYANOW, 1949

Genus *Deshayesites* KASANSKY, 1914

Subgenus *Deshayesites* KASANSKY, 1914

Subgenus *Prodeshayesites* CASEY, 1961 (= *Neodeshayesites* CASEY, 1964)

Subgenus *Paradeshayesites* KEMPER, 1967,

Genus *Dufrenoyia* BURCKHARDT, 1915 (in KILIAN & REBOUL),

?Genus *Burckhardtites* HUMPHREY, 1949,

?Genus *Kuntziella* COLLIGNON, 1962,

Genus *Turkmeniceras* TOVBINA, 1963,

Superfamily HOPLITOIDEA

Family Leymeriellidae BREISTROFFER, 1951,

Subfamily Leymeriellinae BREISTROFFER, 1951

Genus *Leymeriella* JACOB, 1907,

Subgenus *Leymeriella* JACOB, 1907,

?Subgenus *Neoleymeriella* SAVELIEV, 1973,

Genus *Epileymeriella* BREISTROFFER, 1947,

Genus *Proleymeriella* BREISTROFFER, 1947,

Genus *Mathoceras* CASEY, 1964,

?Genus *Pseudoleymeriella* CASEY, 1957

Subfamily *Venezuellinae* KVANTALIANI, 1980

Genus *Venezuella* KVANTALIANI, 1980, (type: *Mathoceras venezolanum* RENZ, 1978),

Venezuella venezolanum (RENZ, 1978),

Venezuella sucre (RENZ, 1978),

Venezuella caribense (RENZ, 1978),

Genus *Renziella* KVANTALIANI, 1980 (type: *Mathoceras laeve* RENZ, 1978),

Renziella laeve (RENZ, 1978).

At this point we can end the examination of the paleontologic data. It is natural that the problem will not be determined if the paleobiologic data are considered without a detailed analysis of the biostratigraphic data.

THE BIOSTRATIGRAPHIC DATA

Tunisia: According to PERVINQUIERE (1907: 185) some specimens of the ammonites referred to *Hoplites* (*Kilianella*?) *matho* PERV. were found between Béja-gare and Oued Zerga, and the rest in Djebel Tella. PERVINQUIERE had no chance to study personally the stratigraphy of the deposits.

He just listed the complex fauna, which (in the transcription of PERVINQUIERE, 1907: 417) consists of the following species: *Phylloceras lateumbilicatum* PERV., *Ptychoceras* cf. *laeve* MATH., *Puzosia getulina* COQ., *Hoplites matho* PERV., *Parahoplites milletianus* D'ORB., *P.* cf. *gargasensis* D'ORB., *P. bigoti* SEUN. All of them were found in association with the Clansayesian "*Douvilleiceras*" *bigoureti* SEUN.

In his monograph on the geology of Eastern Tunisia CASTANY (1951) defined the boundaries of the stages and gave the schemes of the stratigraphic subdivision. According to CASTANY (1951: 144) the subdivision of the Aptian into three substages is classical: the Upper (Clansayesian), the Middle (Gargasian) and the Lower (Bedoulian). But as the fauna of the Gargasian and the Clansayesian is often mixed, and in the Bedoulian fossils are absent, he accepted the following subdivision: the Upper Aptian (Gargasian-Clansayesian), and Lower (Bedoulian).

According to CASTANY (1951: 145) in the massif Zaghuan (Ragoubet el Akfnaia) grey marls and limestones (8 m) of the Bedoulian age are following the Barremian beds. Stratigraphically higher there occur blue marls with rare grey-blue shaly limestone beds, containing in the lower part of the section (100–110 m): *Mathoceras matho* (PERV.), *Parahoplites* sp., *Valdedorsella getulina* (COQ.), *V. angladei* (SAYN), *Protacanthoplites* (?) *bigoureti* (SEUN.), "*Terebratula*" *moutoniana* (D'ORB.) and others. CASTANY supposed that this part of the section must be referred to the Upper Aptian because of the presence of the *Protacanthoplites* (?) *bigoureti*. Higher up occur olive marls with red sandstone beds (40 m) from which SOLIGNAC (1927: 129, 130) and CASTANY (1951: 145) defined the following fauna: *Colombiceras crassicoatum* (D'ORB.), *Protacanthoplites* (?) *bigoureti* (SEUN.), *Valdedorsella angladei* (SAYN), *V. getulina* (COQ.) *Aconeceras nisum* (D'ORB.), *Phyllopachyceras infundibulum* (D'ORB.), *Salfeldiella guetardi* (RASP.), *Protetragonites* cf. *crebrisculatum* (UHL.), *Ptychoceras laeve* MATH., *Hypacanthoplites milletianus* (D'ORB.), *Proleymeriella* cf. *schrammeni* (JAC.), *P.* (?) *lemoinei* (JAC.), *Leymeriella* (*Epileymeriella*) *revili* (JAC.), *Mathoceras matho* (PERV.), *Epicheloniceras martini* (D'ORB.), *Barremites strettostoma* (UHL.), *Neohibolites semicanaliculatus* (BL.), *Mesohibolites fallauxi* UHL.

Taking into account the presence of *Proleymeriella* cf. *schrammeni* (JAC.), *P.* (?) *lemoinei* (JAC.) and *Epileymeriella revili* (JAC.) in these deposits, the distribution of which is limited to the Early Albian, these deposits must be of an Early Albian age. Other species of the indicated complex characterize a Barremian, a Lower, Middle or Upper Aptian age and evidently they are reworked and in a secondary deposition.

In the section Bir Alima (CASTANY 1951: 146) there is essentially the same mixed, complex fauna with Lower Albian ammonites, with the only difference that there is absent *Mathoceras matho* (PERV.). Other sections (Oued Guelta-Djebel

Ech Chama, Pont du Fays, 147; Djebel Zaress, 148) yielded *M. matho* (PERV.), but no typical Lower Albian species. According to CASTANY in all these sections the above-mentioned cephalopods, occupy one and the same stratigraphical level (in all the sections marked as N 18). Many of these cephalopods are redeposited, evidently of different ages, and the deposits containing these fossils are undoubtedly Early Albian. In some sections, together with the indicated ammonites, there occur "*Parahoplites*" *steinmanni* (JAC.), somewhat reminding of Middle Albian hoplitids by its sculpture. Everywhere the described deposits of the Lower Albian are overlapped by the younger deposits of the same stage.

Analyzing all the material of Tunisia, CASTANY (1951: 167) notes that local intensive orogenic movements occurred at the end of the Aptian. In consequence of these movement there appeared conglomerates, most clearly expressed and fixed in the Djebel Serdj sections. During the invasion of the Early Albian sea the ammonites of the more ancient deposits, beginning from the Barremian and including the Clansayesian, were washed out and redeposited.

Similar movements took place in Algeria. JOLEAUD (1912: 147) found complex mixed faunas of Lower Albian age *Proleymeriella schrammeni* (JAC.), Clansayesian (*Protacanthoplites* ? *bigoureti* SEUN.) and Barremian (*Phyllopachyceras infundibulum* D'ORB.) from Algeria.

This was confirmed by BUSNARDO (1955: 239) who noted that very often in the north of Constantine (North-Eastern Algeria, Numidian mountains) the fauna of the Clansayesian is mixed with a fauna of the Early Albian. Therefore I come to the conclusion that the deposits containing *Mathoceras matho* (PERV.) in Tunisia are of Albian (maybe Early Albian) age.

South America: A large part of the ammonites described by RENZ was found at the basis of the Valle Grande formation, the age of which is determined as late Aptian (*martinioides* Zone). Besides the new species, the following ammonites (identified by WRIGHT) were discovered: *Aconeceras nisus* (D'ORB.), *Sanmartinoceras haugi* (SARASIN), *Valdedorsella getulina* (COQ.), *V.* cf. *angladei* (SAYN), *Acanthohoplites* cf. *aschiltaensis* (ANTH.), *Colombiceras* sp., *Gargasicerias* aff. *acuticoatum* (RIEDEL), *Zurcherella zurcheri* (JAC.), *Dufrenoyia justinae* HILL., *D. justinae sanctorum* BÜRG., *Ptychoceras laeve* MATHERON.

The ammonites are mixed and evidently of different ages and – as in Tunisia – they are in secondary deposition at the base of the Valle Grande formation. The species *Aconeceras nisus*, *Colombiceras* sp., *Zurcherella zurcheri*, *Valdedorsella* cf. *angladei* are characteristic of the Middle Aptian (Gargasian), while *Dufrenoyia* has hitherto been known in Lower Aptian deposits only.

Additional interesting informations are given by ROD & MAYNC (1954: 266–268, 276, 277). From the middle Apón Formation of the Sierra de Perijá well preserved ammonites (identified by IMLAY) have been collected. The middle Apón Formation of western Venezuela can be correlated with the Garcia Formation of eastern Venezuela, which is laterally replaced by the lower part of the Valle Grande Formation. This

interval includes the Upper Aptian and the temporal equivalent of the Lower Chimana Formation, the age of which is Early to Middle Albian, containing ammonites of the *mammillatum* Zone in the lower part and of the *dentatus* Zone in the upper part (RENZ 1978: 679). The new species, described by RENZ and referred to *Mathoceras*, were discovered in the deposits of the transitional zone from the Garcia Formation to the Valle Grande Formation.

The mentioned fauna from the middle Apón Formation of the Sierra de perijá seems to be a mixed fauna too with species of different ages (Barremian, Lower, Middle Aptian): *Hamulina* (?), *Chelonicer* cf. *cornuelianum* (D'ORB.), *Deshayesites columbianus* RIEDEL, *Dufrenoyia justinae* (HILL.) and *Colombiceras* aff. *karsteni* (MARCOU). But it contains even specific Albian species as: *Brancoceras* (?), *Knemiceras* sp., and *Douvilleiceras* aff. *monile* (SOW.), which was discovered in situ (ROD & MAYNC, 1954: 266, 267).

On the basis of the occurrence of *Douvilleiceras* aff. *monile* ROD & MAYNC (1954: 267) concluded that the *Douvillei-*

ceras of the New World precedes the forms of the Old World. But in my opinion the finds of ammonites of the genus *Douvilleiceras* confirm once more my conclusion about an Albian (Early Albian) and not Aptian age of the deposits.

Summarizing I come to the conclusion that the type of the genus *Mathoceras* CASEY was discovered in Lower Albian, and not in the Upper Aptian (as it was supposed) deposits of Tunisia together with the typical generic types of the family Leymeriellidae (*Proleymeriella* cf. *schrhammeri* (JAC.), *P. (?) lemoinei* (JAC.), and *Epileymeriella revili* (JAC.)), and together with a mixed Barremian/Aptian fauna in secondary deposition.

In analogy to the circumstances in Tunisia I come to the conclusion that the deposits in Venezuela, which yielded the Leymeriellidae *Venezuela* KVANTALIANI and *Renziella* KVANTALIANI within a mixed fauna have an Early Albian age too, and can be correlated with the *Leymeriella tardefurcata* Zone in Europe.

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Plate 1

- Fig. 1 a-d. *Deshayesites formosus* BOGDANOVA, KVANTALIANI, SCHARIKADZE (1979: 8, pl. IY, fig. 1-6).
- Fig. 2 a-d. *Dufrenoyia caseyi* KVANTALIANI, Holotype N 4 (3057/5-3). Museum Geol. Paleont. Georgian Lenin Polytechnical Institut; Aptian, Dagestan. Author's coll. $\times 1$.
- Fig. 3 a-b. *Burckhardtites palumbes* HUMPHREY (1949: 135, pl. 12, fig. 1-2).
- Fig. 3 c. Suture line of *Burckhardtites* sp. (HUMPHREY, 1949).
- Fig. 4. *Dufrenoyia subfurcata* KASANSKY (in MIKHAILOVA, 1970: 111, fig. 3 ж).
- Fig. 5. *Deshayesites callidiscus* CASEY (in BOGDANOVA, 1971: 66, fig. 4 r).
- Fig. 6. *Deshayesites planus* CASEY (BOGDANOVA, 1971: 66, fig. 4 B).
- Fig. 7. *Deshayesites dechy* PAPP in BOGDANOVA, 1971: 66, fig. 4 б).
- Fig. 8 a, b. *Somalites* TAVANI, 1949 (in ARKELL, KUMMEL, WRIGHT, 1957: 384).

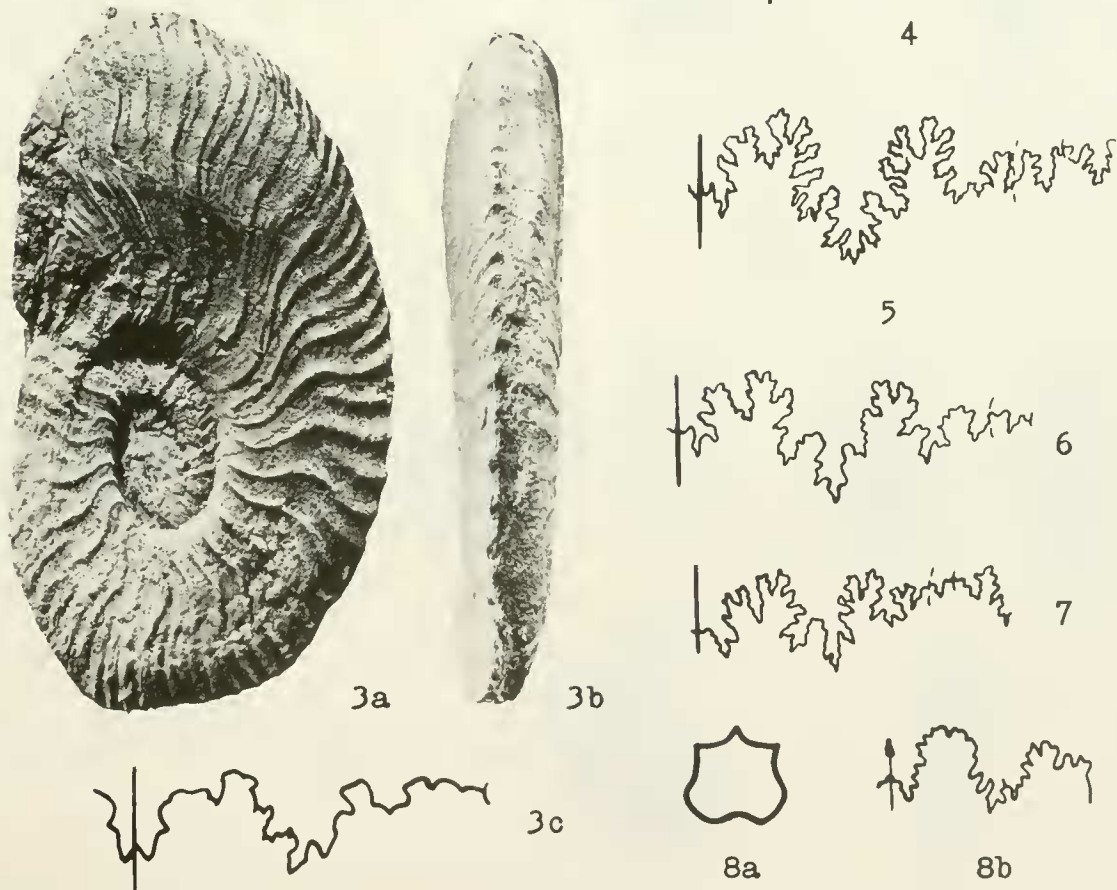
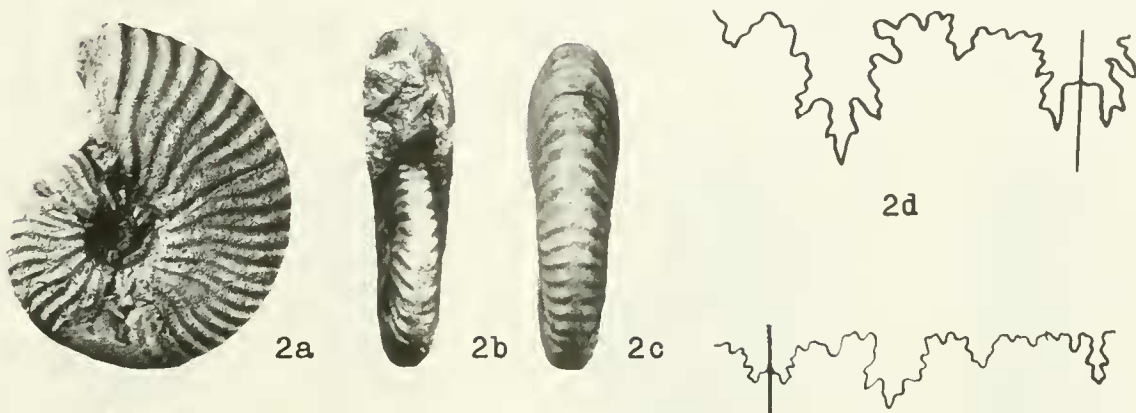
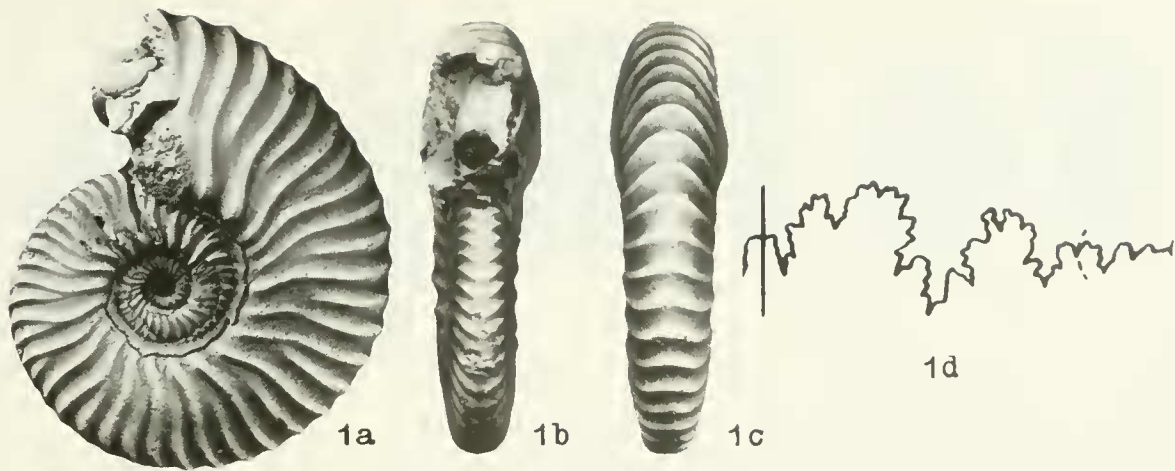


Plate 2

Family Leymeriellidae BREISTROFFER, 1951
Subfamily Leymeriellinae BREISTROFFER, 1951

- Fig. 1 a, b. *Leymeriella* (L.) *tardefurcata* (LEYMERIE in ORBIGNY, 1841: 248, pl. 71, figs. 4, 5).
Fig. 2. Suture line of *Leymeriella* (L.) *tardefurcata* (LEYM. in SAVELIEV, 1973: 197, fig. 41 a).
Fig. 3 a, b. *Leymeriella* (*Neoleymeriella*) *consueta* CASEY (SAVELIEV, 1973: 230, pl. 35, figs. 3 a, b).
Fig. 4 a, b. *Leymeriella* (N.) *crassa* SPATH (JACOB, 1907: 54, pl. VII, fig. 24).
Fig. 5. Suture line of *Leymeriella* (L.) *astrica* GLASUNOVA (in SAVELIEV, 1973: 207, fig. 44).
Fig. 6 a-c. *Mathoceras matho* PERVINQUIÈRE (1907: 185, pl. 7, figs. 31 a, b, 72-in text).

Subfamily Venezuellinae KVANTALIANI, 1980

- Fig. 7 a-c. *Venezuella venezolanum* (RENZ).
Fig. 8 a-c. *Venetuella caribense* (RENZ).
Fig. 9 a, b. *Venezuella sucre* (RENZ).
Fig. 10 a, b. *Venezuella venezolanum* (RENZ).
Fig. 11 a, b. *Renziella laeve* (RENZ).

figs. 7-11 after RENZ (1978: 683, 684).

